5. AIR QUALITY

5.1 Regional and Project Setting

5.1.1 Climate

The Pacific Ocean is a moderating influence on the climate of the North Coast region. The region and JDSF have a Mediterranean climate, characterized by a pattern of low-intensity rainfall in the winter and cool, dry summers. Fog is a dominant climatic feature in the summer and frequently during the rest of the year. Air temperature is strongly influenced by the extent of the coastal fog belt, which typically extends about 10 miles inland during summer nights, generally burning off to the coast by afternoon. The mean monthly air temperature, measured in the Caspar Creek watershed on JDSF between 1990 and 1995, ranged from 60^{o} F (15.6^{o} C) in July and August to 44^{o} F (6.7^{o} C) in December (Zeimer, 1996). The monthly average maximum air temperature at the same location was 72^{o} F (22.3^{o} C) in July, and the average minimum was 40 ^{o} F (4.7^{o} C) in December.

About 90 percent of the precipitation in this area falls between October and April, with the highest average monthly precipitation in January. Winter storms from the Pacific Ocean bring intense rainfall over several hours or days, particularly warmer storms from lower latitudes. Snow is infrequent and usually does not last long even at higher elevations inland. Mean annual precipitation is 39 inches at Fort Bragg (CDWR, 1997), but measures higher in the Caspar Creek watershed, where annual means of 51 inches and 45 inches have been recorded at the North and South Fork gages, respectively (Zeimer, 1996). Mean annual precipitation at Willits, just a few miles to the east of the JDSF, is slightly higher at 55 inches (CDWR, 1997).

5.1.2 Air Quality

The JDSF is located in Mendocino County within the North Coast Air Basin. The Mendocino County Air Quality Management District is the agency responsible for enforcement of all State and Federal Air Quality Laws and Local Air Quality Regulations in Mendocino County. The District's legal boundaries are coterminous with the County boundaries; however the District is part of the larger North Coast Air Basin, which includes Del Norte, Trinity, Humboldt, Mendocino and part of Sonoma County.

5.1.3 Prevailing Air Quality

The air quality of a region is determined by the quantities and types of pollutants emitted, the spatial distribution of the emission sources, and by the concentrations and accumulations of those pollutants under the influences of local meteorology and topography.

Consistent with the Federal Clean Air Act of 1970, the U.S. EPA established national ambient (outside) air quality standards. The standards were established for several air pollutants based on specific medical evidence and consist of an averaging time and the numeric concentration. The Federal standards are two tiered: primary standards—designed to protect public health; and secondary standards—designed to protect the environment, such as visibility, damage to property, soil, vegetation, etc. Table VII.5.1 lists the air pollutants and the federal ambient air quality standards. Recently, the EPA revised the list of air pollutants to include particulate matter with a diameter of 2.5 microns or less (PM2.5) to more closely regulate the particle size range responsible for health effects. Monitoring and inventories for particulate matter are maintained for PM2.5 and PM10 (particulate matter with a diameter of 10 microns or less).

Ambient air quality standards are set to address both short-term and long-term air quality impacts on human, animal, and other biotic and abiotic receptors. They are applied to measurements of ambient air quality; that is, the combination of all pollutants from all sources found at monitoring points. Given these considerations, ambient air quality standards can be considered as benchmarks for significant adverse cumulative effects of air pollutants.

The state of California also promulgates ambient air quality standards, several of which are more stringent than the federal standards, and include sulfates, hydrogen sulfide, and vinyl chloride. California air quality standards are included in Table VII.5.1. Air quality standards are expressed in terms of concentrations (e.g., parts per million [ppm], or micrograms per cubic meter [$\mu g/m^3$]).

To determine whether the air quality of an area meets or exceeds the ambient standards, ambient air quality monitoring is conducted. The MCAQMD is required to monitor air quality in the County as part of a coordinated State and National monitoring network. The MCAQMD maintains monitoring sites in Fort Bragg, Willits, and Ukiah. Ambient air quality monitoring, and comparison of the measurements to ambient air quality standards, provides an effective measure of the cumulative effects of air pollution.

Ozone (O_3), Carbon monoxide (CO), and nitrogen oxides as nitrogen dioxide (NO_2) are monitored in Ukiah and Willits. Particulate matter, PM10, is monitored in Fort Bragg, Willits, and Ukiah. The air quality monitoring sites most representative of air quality conditions in the JDSF are those in Fort Bragg and Willits since they are closest to the JDSF. Table VII.5.2 summarizes the annual average and maximum measured short-term pollutant concentrations over the most recent 5-year period from 1999 through 2003.

Table VII.5.1. California And National Ambient Air Quality Standards.

Pollutant	Averaging Time	California Standards	NATIONAL STANDARDS (a)	
			Primary (b,c)	Secondary (b,d)
Ozone	8-hour	—	0.08 ppm (176µg/m^3)	—
	1-hour	0.09 ppm (180 µg/m^3)	0.12 ppm (235 µg/m^3)	Same as primary
Carbon monoxide	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	—
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
Nitrogen dioxide	Annual	—	0.053 ppm (100 µg/m^3)	Same as primary
	1-hour	0.25 ppm (470 µg/m^3)	—	—
Sulfur dioxide	Annual	—	0.03 ppm (80 µg/m^3)	—
	24-hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	—
	3-hour	—	—	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	—	—
PM10	Annual	20 µg/m^3 (arithmetic mean)	50 µg/m^3 (arithmetic mean)	Same as primary
	24-hour	50 µg/m^3	150 µg/m^3	Same as primary
PM2.5	Annual	12 µg/m³	15 µg/m^3	
	24-hour	—	65 µg/m^3	
Lead	Calendar quarter	—	1.5 µg/m^3	Same as primary
	30-day average	1.5 µg/m^3	—	—

a) Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.
b) Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.
c) Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after the EPA approves that states implementation plan.
d) Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

The air quality in the JDSF region is generally good. Mendocino County, including JDSF, is in attainment for all state and federal air quality standards, with the exception of the state standard for PM10. Levels of PM10 recorded at monitoring stations in Willits and Fort Bragg have occasionally exceeded the state daily limit (Tables VII.5.2 and

VII.5.3); therefore, the entire District, including the JDSF, is considered to be in non-attainment for PM10. The 1999 exceedances were coincident with severe smoke inundation of all of Northern California due to wildfires north and east of Mendocino County. The Mendocino County Air Quality Management District is currently preparing a Particulate Matter Attainment Plan to address PM10 non-attainment (information available at http://www.co.mendocino.ca.us/aqmd/pages/Attainment Plan.htm).

Table VII.5.2. Maximum Measured Air Pollutant Concentrations in the JDSF Region.

Pollutant	Average Time	Measured Air Pollutant Levels				
		1999	2000	2001	2002	2003
Fort Bragg						
Particulate Matter (PM10)	24-Hour	66 µg/m^3	49 µg/m^3	61 µg/m^3	54 µg/m^3	65 µg/m^3
	Annual	24.3 µg/m^3	22.4 µg/m^3	24.1 µg/m^3	22.2 µg/m^3	21.4 µg/m^3
Willits						
Ozone (O_3)	1-Hour	0.066 ppm	0.054 ppm	0.062 ppm	0.086 ppm	0.090 ppm
	8-Hour	0.059 ppm	0.046 ppm	0.047 ppm	0.057 ppm	0.055 ppm
Carbon Monoxide (CO)	8-Hour	1.81 ppm	1.47 ppm	1.41 ppm	1.30 ppm	1.59 ppm
Nitrogen Dioxide (NO_2)	1-Hour	0.056 ppm	0.035 ppm	0.044 ppm	0.080 ppm	0.053 ppm
	Annual	.008 ppm	0.007 ppm	0.007 ppm	0.008 ppm	0.009 ppm
Particulate Matter (PM10) (Federal Method)	24-Hour	62 µg/m^3	48 µg/m^3	49 µg/m^3	74 µg/m^3	35 µg/m^3
	Annual	20.6 µg/m^3	17.2 µg/m^3	18.2 µg/m^3	18.7 µg/m^3	16.2 µg/m^3
Particulate Matter (PM 2.5) (Federal Method)	24-Hour	35.6 µg/m^3	20.0 µg/m^3	38.3 µg/m^3	16.9 µg/m^3	—
	Annual	8.85 µg/m^3	7.21 µg/m^3	7.97 µg/m^3	5.71 µg/m^3	—

ppm: parts per million; NA: data not available.
Values reported and underlined exceed state ambient air quality standards

Table VII.5.3 Number of Days of Particulate Matter Exceeded the State Standard for Pm10, by Monitoring Location, 1997-2003.			
	Location		
Year	Ukiah	Willits	Fort Bragg
1997	0	1	2
1998	0	0	1
1999	1	1	2
2000	0	0	1
2001	0	0	4
2002	1	1	2
2003	0	0	4
Source: Mendocino County Air Quality Management District website (http://www.co.mendocino.ca.us/aqmd/pages/historic.htm)			

As is consistent with other areas of the North Coast (NCUAQMD, 1995), PM10 levels in Mendocino exhibit a seasonal pattern. PM10 concentrations typically increase during the winter months and are at their lowest levels during the summer months. Results of a North Coast Air Quality Management District study (NCUAQMD, 1995) showed that woodstove emissions during the winter months, when added to the ever-present emissions of vehicles and sea salts, are the primary cause of high PM10 values in the North Coast. Analysis of makeup of PM10 collected in Eureka and Crescent City showed that, on an average basis, sea salt accounted for 25 percent to 35 percent of the total PM10, and woodstoves contributed 12 percent to 22 percent of the total PM10. In Weaverville, while the contribution from sea salts was insignificant, PM10 from woodstoves comprised 29 percent of the total PM10 measured. For the periods when the measured PM10 exceeded the State 24-hour standard of 50 ug/m3, the contribution to the total measured PM10 from wood stoves was 49 percent in Eureka, 27 percent in Crescent City, and 59 percent in Weaverville (North Coast Unified AQMD).

PM10 is small enough to be inhaled and can be especially harmful to people with existing vascular or respiratory illness, the aged, and the very young. Particulate matter has several health effects. The direct, medically observed, effects of PM exposure include:[1]

- increases in blood pressure
- decreases in heart function

Health studies have shown that higher ambient PM levels:

- are known to increase the occurrence rate of asthma
- are known to result in more frequent asthma attacks
- are know to decrease the rate of lung growth

[1] (http://www.co.mendocino.ca.us/aqmd/pdf_files/Attainment%20Plan%20sept%2004.pdf)

- are known to aggravate bronchitis
- are strongly believed to reduce childhood lung function
- are strongly believed to cause long term elevated blood pressure
- are strongly believed to decrease the age of onset for asthma in those susceptible
- are very likely to contribute to premature death and hospital visits for those with existing heart and lung ailments

Particulate matter from diesel engines has been identified as being of particular concern for its toxic qualities. While diesel engine emissions are a small part of total PM emissions in Mendocino County (approximately 2 percent of PM10 and 5% of PM2.5 emissions in 2003), they are of serious concern because they are an identified air toxic. The California Air Resources Board (CARB) has identified that PM from diesel exhaust is an air toxic and likely to cause cancer. US EPA concerns with diesel PM are stated within their websites dealing with the subject and may be viewed at http://www.epa.gov/ttnatw01/nata/perspect.html. This reference states in part:

> A large number of human epidemiology studies show increased lung cancer associated with diesel exhaust. Furthermore, exposures in these epidemiology studies are in the same range as ambient exposures throughout the United States. In addition to the potential for lung cancer risk, there is a significant potential for non-cancer health effects as well, based on the contribution of diesel particulate matter to ambient levels of fine particles. Exposure to fine particles contributes to harmful respiratory and cardiovascular effects, and to premature mortality.

5.1.4 Existing Emission Sources

Air pollutant emission sources in Mendocino County include stationary sources; mobile sources, both highway and off road; area sources, such as from use of consumer products, residential fuel combustion, unpaved road dust, and wind blown dust; and natural sources. An emission inventory of air pollutant emissions for Mendocino County is compiled by CARB with input from the MCAQMD. The emission inventory tabulates annual average pollutant emissions (in tons per day) from each source category. Table VII.5.4 lists the most recent emission inventory information (2003).

Table VII.5.4. Estimated 2003 Annual Average Emissions (Tons Per Day) For Mendocino County.

Source Category	ROG	CO	NO_x	SO_2	PM2.5	PM10
Stationary	2.00	0.17	0.42	0.38	0.24	0.35
Area Sources	4.17	19.68	0.51	0.24	6.13	19.23
Mobile (On-road)	4.92	44.31	7.24	0.04	0.12	0.17
Mobile (Other)	2.83	15.96	4.98	0.14	0.40	0.45
Natural Sources	0.24	6.58	0.30	--	1.15	1.29
Total	14.16	86.70	13.45	0.80	8.03	21.49

1) ROG = Reactive Organic Gases (ozone precursor); CO = Carbon Monoxide; NOx = Nitrogen Oxides (ozone precursor); SO_2 = Sulfur Dioxide; PM2.5 = Particulate Matter, less than 2.5 microns; PM10 = Particulate Matter, less than 10 microns.
2) Source: California Air Resources Board 2003 (http://www.arb.ca.gov/app/emsinv/emssumcat_query.php?F_DIV=0&F_DD=Y&F_YR=2003&F_SEASON=A&SP=2004&F_AREA=CO&F_CO=23)

The primary sources of PM10 in Mendocino County are area sources, such as dust from roads, agriculture, and residential fuel combustion. More than two-thirds (69 percent) of the PM10 emissions (13.20 of 19.23 tons per day) in the area source category are from unpaved roads (12.98 tons/day) and wind blown dust (0.22 tons/day). The effects of dust emitted from unpaved roads tend to be localized to areas near the roads, particularly in areas where dispersion is limited by trees and vegetation. Road dust emissions are greatest during the drier months of the year.

Unpaved road dust emissions include emissions from both farm and non-farm roads. In Mendocino County, non-farm road emissions account for more than 98 percent of the road emissions. Emissions from unpaved roads are estimated by the CARB separately for three major unpaved road categories: city and county roads, U.S. forest and park roads, and Bureau of Land Management (BLM) and Bureau of Indian Affairs (BIA) roads. In computing the dust emissions, the CARB (CARB, 1997) assumes that there are 10 vehicle miles traveled per mile of roadway per day, and that all roads emit PM10 at the same rate of 2.27 pounds of PM10 per vehicle mile traveled. In the emission inventory, about 60 percent of the unpaved roads (or about 670 miles) in Mendocino County are in forest or park lands, which would include the roads in the JDSF.

Other significant area source PM10 emissions include those for residential fuel combustion (2.50 tons), which includes wood burning in stoves and fireplaces; construction and demolition (1.05 tons), paved road dust (2.00 tons), and waste burning and disposal (0.34 tons), which included agricultural burning, and burning for range improvement and forest management. The natural source emissions category for Mendocino County only includes emissions from wildfires; other sources, such as sea salts, which are discussed above, are not included. Thus, for coastal areas such as Mendocino, the CARB emission inventory for PM10 does not include the contribution of

sea salts that may be present. There are few stationary sources of emissions in Mendocino County. PM10 emissions from stationary sources (0.35 tons per day) represent about 2 percent of the total PM10 emissions in the County. PM10 emissions from diesel engines of all types represent about 2 percent (0.42 tons per day) of the total PM10 emissions in the county.

Emissions from the JDSF are predominantly PM10, resulting from timber harvesting activities and vehicle travel on roads within the JDSF. These activities result in particulate matter and gaseous pollutant emissions. Specifically, timber harvesting includes the following operations: logging and associated transportation, site preparation, slash control by broadcast or pile burning, and road construction and maintenance. The air quality effects associated with the timber harvesting can be divided into several distinct categories of emissions:

- fugitive dust from paved and unpaved roads
- emissions from road construction
- gaseous emissions from fuel combustion
- emissions from slash burning

Fugitive dust is generated by vehicle travel on paved and unpaved roadways, grading and site preparation, road construction, and any other activity that disturbs surface soils. Fugitive dust is a source of fine particulate emissions or PM10. Table VII.5.5 reports the miles of roads on JDSF by use category and surface type. Closed and decommissioned roads do not have active transportation use and are partially to fully revegetated. These roads produce little or no particulates.

Table VII.5.5. JDSF Road Miles by Surface and Use Category.

Surface	Use	Miles	Percentage of Total Road Miles
Native	Unclassified	25	5.6
Native	Closed (Self-Abandoned 4 Wheel)	89	19.8
Native	Decommissioned	10	2.2
Native	Scheduled to be Decommissioned	8	1.8
Native	Temporary	7	1.6
Native	In Use	184	40.9
Rocked	In Use	107	23.8
Paved	In Use	20	4.4
	TOTAL	450	100

Fuel combustion emissions are associated with vehicle operation, heavy construction equipment operation, and operation of motorized hand-held equipment (chain saws).

Fuel combustion results in emissions of gaseous air pollutants, such as CO, ROGs, SO2, and NO_X.

Emissions from slash burning result in both PM10 and gaseous emissions, although PM10 emissions are the most significant effect from burning. Prescribed broadcast burning, which is carried out under targeted conditions for factors such as fuel moisture, wind speed, temperature, and humidity, has been used periodically as a site-preparation technique on JDSF. Prescribed burning may also be conducted for fire suppression or to mimic natural fire conditions. CDF has authority to self-issue an interagency burn permit to JDSF that meets both the Air Quality and Fire Agency requirements. The purpose of the interagency burn permit is to allow a single permit to serve the needs of both the Fire Agency and Air Quality District. In addition to the permit Air Quality District notification is required for any prescribed burn over 10 acres.

Two areas of air toxics emissions are of concern for Mendocino County and JDSF management: air borne asbestos from asbestos-bearing soils and rocks and particulate emissions from diesel engines of trucks, construction equipment, and logging equipment.

Exposure and disturbance of rock and soil that contains asbestos can result in the release of fibers to the air and consequent exposure to the public. State and federal health officials consider all types of asbestos to be hazardous. No safe asbestos exposure level has been established for residential areas. The risk of disease depends upon the intensity and duration of exposure. Exposure to low levels of asbestos for short periods of time poses minimal risk. The most common serious diseases caused by asbestos are asbestosis, lung cancer, and mesothelioma.

Asbestos most commonly occurs in ultramafic rock that has undergone partial or complete alteration to serpentine rock (serpentinite) and often contains chrysolite asbestos. In addition, another form of asbestos, tremolite, can be found associated with ultramafic rock, particularly near faults. Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. Sources of asbestos emissions include: unpaved roads or driveways surfaced with ultramafic rock, construction activities in ultramafic rock deposits, or rock quarrying activities where ultramafic rock is present. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed.

The MCAQMD has identified areas of the county that are likely to be underlain by asbestos bearing soils (http://www.co.mendocino.ca.us/aqmd/pdf_files/MCAQMD NOA PLS.pdf). This area includes roughly 20 percent of the area of the county. Areas just to the east of the JDSF boundary are identified as potentially having asbestos-bearing rocks or soils. However, existing soil survey information as well as field observations by

staff soils scientists and geologists do not indicate the presence of asbestos-bearing soils or parent material within JDSF (Munn pers. com. 2004, Bawcom pers. com. 2004). Reports from the California Geological Survey do not indicate the presence of asbestos-bearing rocks with JDSF (Clinkenbeard et al. 2002; Churchill and Hill 2000). See the Geology and Soils section of this DEIR for more information on JDSF soils and lithology.

The air toxic of greatest concern from management of JDSF is diesel particulate matter. CARB has identified that PM from diesel exhaust is an air toxic and likely to cause cancer. While diesel vehicle emissions are a small part of total PM emissions in Mendocino County, they are of serious concern because they are an identified air toxic.

Timber harvesting constitutes the primary JDSF activity where the operation of diesel engines and associated PM10 emissions would occur. These emissions become part of the total PM10 load released into the atmosphere for the Fort Bragg area. Table VII.5.3 data indicates that PM10 levels for the Fort Bragg area have been in compliance with the State standard approximately 96% of the time over a seven year period (days measured multiplied by six projected days per measurement and divided by total days within the seven year period). However, any day in excess of the State standard constitutes non-attainment under State law. Therefore, the issue that must be analyzed is whether timber operations on JDSF are likely to produce diesel PM10 emissions at significant levels.

Direct discussion with the MCAQMD, September 24, 2004, indicated that a threshold of significance for PM10 levels of 80 tons per year from any single project has been established per MCAQMD regulations. This threshold has been established in compliance with the Federal Significance Level for the Prevention of Deterioration in the North Coast Air Basin. Knowing precisely the amount of PM10 that will be produced from timber operations on JDSF is difficult to determine. However, a reasonable estimate may be obtained by computing the average hours of operations, number and types of equipment in operation, operating days per year and assumed haul distances based on available milling facilities. This exercise also involves referral to Federal EPA data on the expected emissions from diesel internal combustion engines, which are the primary power source in nearly all timber harvesting operations. (Source: Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources. http://www.epa.gov/ttn/chief/ap42/).

The estimate of PM10 production assumed five logging operations operating annually, each for a period of 120 working days, 10 hours per day, and supplied with an appropriate number of yarders, skidders, loaders, and log trucks operating at approximately 300 horsepower per unit. These assumptions produced an estimate for PM10 production of approximately 14 tons per year, well below the 80 ton per year threshold established by the MCAQMD. Based on this analysis a reasonable conclusion may be made that timber operations on JDSF will not result in significant release of or exposure to diesel PM10 emissions.

5.2 Regulatory Framework

CARB coordinates and oversees both State and Federal air pollution control programs in California. The CARB has divided the State into air basins. Authority for air quality management within them has been given to local Air Pollution Control Districts, which regulate stationary source emissions and develop local non-attainment plans within their jurisdiction. The MCAQMD is the local agency empowered to regulate air quality in Mendocino County, which together with Del Norte, Humboldt, Trinity, and northern Sonoma Counties make up the North Coast Air Basin.

The MCAQMD is mandated under the Federal Clean Air Act to ensure compliance with ambient air quality standards, and in cases where such standards are violated, to devise a plan for attaining the standards. Such a plan is referred to as the State Implementation Plan. The District regulates emissions from stationary sources while the state regulates emissions from mobile sources such as cars and trucks. The latter also includes emission standards for heavy construction equipment powered by diesel engines. The EPA adopted ambient standard for PM 2.5 has been implemented at the state and MCAQMD levels. The District is presently designated as unclassified for PM2.5; however, no 2.5 exceedances have been recorded by the MCAQMD, and District general PM2.5 levels are well below the standards.

Emissions from mobile sources are regulated by State and Federal requirements that limit tailpipe emissions from mobile sources, including cars, trucks, construction equipment, etc. Fugitive dust emissions are regulated under District Regulation I, Chapter 4, Rule 430. Open burning is regulated under MCAQMD Regulation II, Rules 301-401.

Air toxics are regulated by the CARB. CARB's statewide comprehensive air toxics program was established in the early 1980s. The Toxic Air Contaminant Identification and Control Act (AB 1807, Tanner 1983) created California's program to reduce exposure to air toxics. The primary regulatory mechanisms are "airborne toxic control measures" (ATCMs). Each ATCM is codified under Title 17 of the California Code of Regulations (17 CCR). CARB's regulation of diesel engine emissions (trucks, construction equipment, and logging equipment) and air borne asbestos are the most relevant areas of air toxics regulations for JDSF.

Additionally, the California Forest Practice Rules, under Article 7, regulates the burning of piles and slash, specifying when permits are required, notification, methods of burning, and when burning is allowable.

5.3 JDSF Management Measures

Roads and Road Dust Emissions

There are approximately 350 miles of road within the Forest that are utilized year-round, periodically, or during specific times of the year (Table VII.5.5, above). The majority of roadway that is open to use throughout most of the year has a heavily rocked surface. Native surface roadways are generally closed during the wet weather months (November through April). Due to concerns about road erosion and watershed protection, a significant portion of the road system remains closed to vehicular traffic except for periodic land management and administrative access. Forest roads on JDSF are used for timber harvesting, forest management activities, forest protection, public access, and recreation (DFMP, Appendix VI: Road Management Plan). Numerous studies have shown that forest roads are a major source of management-related stream sediment (Furniss et al. 1991). The Management Plan for JDSF includes a program to inventory and improve its road system. Additionally, the plan provides guidelines for new road construction. The objective of the Road Management Plan is to ensure that the design, construction, use, maintenance, and surfacing of all JDSF roads will minimize sediment delivery to aquatic habitats. Implementation of this plan will also improve air quality by reducing PM10 emissions from vehicle travel on unpaved roads.

One of the primary sources of PM10 emissions in the JDSF is from vehicle travel on unpaved roads. The potential for generating airborne particulate matter from travel on unpaved roads can be minimized by several means, including: reducing vehicle traffic, reducing the availability of roads to travel on, reducing vehicle travel speeds, resurfacing roads with less erodible materials (gravel or asphalt), road maintenance, and dust abatement methods (watering or chemical stabilizers).

The JDSF Forest Management Plan has been compiled to address, among other things, the road management system. The following summarizes the principals stated in the DFMP (DFMP, Appendix VI: Road Management Plan) that will have an effect on the air quality of the JDSF:

- The total mileage of roads will be minimized through basin-wide planning.
- Existing roads will be used wherever appropriate, in preference to building new roads. Substandard roads with drainage and sediment production problems will be reconstructed, re-graded, re-aligned, resurfaced, or otherwise treated to prevent sediment delivery to watercourses, or they will be abandoned properly.
- Roads that are not in good condition will be properly abandoned.
- New roads will be designed to the minimum width necessary to safely accommodate required traffic, with turnouts spaced appropriately for the road class (as per the guidelines in the California Forest Practice Rules). All roads will be

classified according to expected use (high, medium, or light) and maintained accordingly.

- During periods of commercial use, road surfaces will be treated to prevent or minimize dust and associated PM10 emissions.

The Road Management Plan recognizes the need for dust abatement and calls for roads that are actively used for hauling during the dry period of the year to be treated to reduce the generation of road dust. Generally, this will mean watering the roads as needed;[2] chemical treatments might also be employed in certain situations. Additionally, roads intended for year-round log hauling will be surfaced to reduce erosion potential. Surfacing agents include, but are not limited to: rock, chip seal, and asphalt paving.

Smoke from Prescribed Fire and Slash Burning

Fire is important in maintaining natural ecosystem processes, such as enhancing variability in stand structure and species diversity. The Forest has potential to be used as an experimental site for conducting research on fire as a management tool. Numerous benefits would be realized through this research, such as the use of fire to reduce hazards (primarily through fuel reduction), as a silvicultural treatment (see Timber Resources, Section VI-6.3), for elimination of slash (broadcast or pile burning), as an ecosystem management tool, and as a vegetation management technique to protect, maintain, or improve wildlife or plant habitat. A prescribed fire program that focuses on these research goals would be implemented as resources allow (DFMP, page 83).[3] Smoke from prescribed fire and slash burning produces particulate matter.

If any prescribed fire or slash burning projects are developed, the JDSF manager (Marc Jameson, personal communication, 12/29/04) indicates that they will be done only under prescription and on permissive burn days with necessary permits from the MCAQMD.

5.4 Thresholds of Significance

Based on policy and guidance provided by CEQA (PRC Section 21001 and the CEQA Guidelines), an impact of the proposed project would be considered significant if it causes one or more of the following:

- violates or substantially contribute to a violation of the ambient air quality standards
- conflict with or obstruct implementation of the applicable air quality plan

[2] Note: Potential water quality and biological effects of water drafting are addressed elsewhere in this DEIR.

[3] Page references to the DFMP refer to the electronic version (PDF) posted at the Board's website: http://www.bof.fire.ca.gov/pdfs/jdsf_mgtplan_master%203b.pdf.

- a cumulatively considerable net increase in emissions of any criteria pollutant for which the project region is non-attainment
- the release or significant exposure of public to air toxics

A project is not considered significant if there is no significant increase in emissions over the baseline and there is no potential for violation of State or Federal air quality standards.

5.5 Project Individual and Cumulative Impacts

Because Mendocino County is in non-attainment for the State PM10 standard, this analysis primarily focuses on how activities on JDSF lands could contribute to changes in ambient PM10 levels. As described above, PM10 emissions result from vehicle travel on paved and unpaved roads, slash burning, vehicle and equipment exhaust, and other types of fuel combustion. The largest source of PM10 emissions on JDSF is from vehicle and equipment travel on unpaved roads and other unpaved areas. Slash burning represents the second largest source of PM10 emissions but the magnitude of these emissions is substantially less than from unpaved road dust. The remaining emission sources contribute minor amounts to the total PM10 emitted.

From a seasonal standpoint, PM10 emissions in the JDSF are the greatest during the summer months when timber harvesting and other activities occurs and soil surface moisture is the lowest. During the winter wet season, PM10 emissions from road dust are negligible due to the mitigating effects of elevated soil moisture content. Thus, PM10 emissions from activities in the JDSF would be the lowest when historically the PM10 monitoring stations in the North Coast have measured the highest ambient PM10 concentrations.

In assessing potential impacts on air quality from PM10 emissions in the JDSF under the different alternatives being considered, both the magnitude of the emissions (increase or decrease from baseline conditions) as well as their effect on ambient PM10 concentrations need to be assessed. Factors to be considered when assessing potential PM10 impacts include:

- The types of emissions sources and the reason for emissions (e.g., due to timber harvest or recreation activities): Road dust from vehicle travel on unpaved roads and other areas represent the largest portion of PM10 emissions.
- The spatial distribution of emissions in the JDSF: PM10 emissions are dispersed geographically along roadways and in active timber harvest areas at various locations in the JDSF.
- The temporal nature of emissions in the JDSF: Emissions will vary with the degree of activity in the JDSF throughout the year, with the greatest degree of activity, and emissions, during the summer months.

- Other factors that would increase/decrease PM10 emissions under the alternatives being considered: This includes implementation of the Road Management Plan that contains measures that would generally reduce PM10 emissions from roadways.

Impact 1: ***Violate or substantially contribute to a violation of the ambient air quality standards.*** **(Less than Significant Impact)**

Management of the JDSF and timber harvest activities have the potential for localized, short-term effects associated with vehicular movement or slash burning.

Ambient air quality monitoring for the area has shown that State 24-hour average PM10 occasionally exceeds the State standards. Based on the Fort Bragg and Willits sampling stations, there have been 15 instances in the past 5 years when the monitored concentrations exceeded the State 24-hour or annual standard; two times in 1999 were attributed to wildfires in the region (Table VII.5.3). There have been no measured exceedances of the Federal 24-hour or annual average PM10 standards in the last five years.

As discussed earlier, higher PM10 concentrations tend to occur during the winter (wet) months. During these periods PM10 emissions from unpaved roads, and their contribution to ambient PM10 concentrations, would be insignificant due to decreased vehicle traffic in the winter and the mitigating effects of the increased roadway soil moisture.

Open burning, which may occur during the winter month, would be managed and conducted in accordance with the California Forest Practice Rules and in compliance with the MCAQMD open burning regulations. The CARB determines the days when open burning is allowed. The decision of whether it is a burn/no-burn day is based on meteorological data collected daily and the ability of the area to disperse smoke. Open burning is not allowed on days when it could adversely affect air quality.

Given the management activities proposed in the DFMP (alternative C1) and based on the timing and the temporary and geographically dispersed nature of emissions from activities associated with the management of the JDSF, it is reasonable to conclude that these activities would not violate or substantially contribute to a violation of an ambient air quality standard. Any impact would be less than significant. Alternative C2 is essentially identical to alternative C1 in terms of ambient air pollution potential, and therefore would have a less than significant impact.

A finding of less than significant is made for the other six EIR alternatives as well. Alternative A proposes minimal management activities and would reduce air emissions overall by reducing harvest-related traffic and equipment use, and eliminating

prescribed burning. Some impacts would remain, however, due to continued recreational traffic on existing roads, lack of a Road Management Plan, and an increased risk of severe wildfires in the absence of active fire suppression measures. Alternative A would have a less than significant impact.

Alternative B would not be significantly different from alternative C1in its overall level of air pollutant generating activity related to timber harvest, except for having a lower level of road improvement (i.e., no Road Management Plan) and associated long-term reduction in PM10 generation. Alternative B would have a less than significant impact on violation of ambient air quality standards.

For this impact area, alternatives D though F are distinguished from alternative C1 primarily by their lower levels of timber harvest activities. This difference would result in lower levels of PM10 generation. These alternatives would have a less than significant impact on ambient air quality.

Mitigation: None Required.

Impact 2: ***Conflict with or obstruct implementation of the applicable air quality plan.*** **(Less than Significant)**

The MCAQMD is the regional agency responsible for overseeing and regulating air quality in Mendocino. The MCAQMD has developed and implemented rules and regulations that address PM10, as well as NOx, SO_2, VOCs, ozone, and air toxics. The rules and regulations of the MCAQMD have been incorporated into the State's overall State Implementation Plan (SIP). Emissions from activities associated with the proposed management of the JDSF would be consistent with activities allowed under the MCAQMD rules and regulations and would be conducted in compliance with applicable regulations (e.g., fugitive dust and open burning). Thus, the proposed JDSF management plan would not conflict with the State and local air quality planning requirements. This finding applies to all of the EIR alternatives.

Mitigation: None Required.

Cumulative Impact 3: ***Results in a cumulatively considerable net increase in emissions of any criteria pollutant for which the project region is non-attainment.*** **(Less than Significant)**

The project area is non-attainment for PM10 with respect to the State PM10 standards. However, it is considered as being in attainment with the Federal PM10 standards. PM10 emissions would primarily result from vehicle travel on unpaved areas and from open burning (slash burning and other maintenance burning activities) under the proposed JDSF management plan. Roadway emissions would be minimized by implementation of

the proposed Road Management Plan which would potentially reduce the number of traveled roads, increase maintenance of existing and new roads, surface existing and new roads intended for year-round log hauling, and implement a dust control program for roads. Emissions from burning activities are not expected to increase significantly. Thus, emissions from the proposed action, with implementation of the Road Management Plan, are not expected to result in a cumulatively considerable net increase in emissions of PM10.

From an area-wide air quality planning perspective the existing emissions inventory prepared by the CARB already includes emissions from these activities for purposes of cumulative analysis, and likely overestimates existing emissions of fugitive dust from unpaved roads in the JDSF. The CARB's calculation procedure for PM10 emissions from unpaved roads assumes that, on an annual average basis, 10 vehicles per day travel the entire length of every unpaved road. This is likely an overestimate in the overall degree of use of roads in the JDSF, resulting in an overestimate of actual emissions.

Based on these factors, the proposed project (alternative C1) would have a less than significant impact. The same finding is made for the other six alternatives based on similar factors. Although, due to the lack of a Road Management Plan as a part of alternative B, this alternative would likely result in a somewhat higher level of PM 10 emissions, but still at a less than significant level.

Mitigation: None Required.

Impact 4: ***Result in the release or significant exposure of public to air toxics.*** **(Less than Significant)**

The management activities proposed for JDFS will not result in a significant release of or a significant exposure of the public to air toxics. Asbestos from asbestos-bearing soils or rocks will not be released to the air because such rocks and soils are not found on JDSF. Estimates presented above indicate diesel engine PM10 production of approximately 14 tons per year due to JDSF management, well below the 80 ton per year control threshold established by the MCAQMD. Based on this analysis a reasonable conclusion may be made that timber operations on JDSF will not result in significant release of or exposure to diesel PM10 emissions.

Alternative A also would have a less than significant level of impact, given its minimal level of management activity, including soil disturbing activity and lack of timber-harvest-associated machinery use. Alternatives B, C2, and D through F also would result in a less than significant impact for the same reasons as alternative C1.

Mitigation: None required.

5.6 Alternatives

A comparison of impacts among alternatives is presented in Table VII.5.6.

Table VII.5.6. Comparison of Air Quality Impacts by Alternatives.						
Alternatives						**Discussion**
Impact*	**1**	**2**	**3**	**4**	**5**	***Impact Levels: (1) Beneficial (2) No Impact (3) Less than Significant (4) Less than Significant after Mitigation (5) Significant–Mitigation Not Feasible**
Impact 1. Violate or substantially contribute to a violation of the ambient air quality standards						
Alt. A						Alternative A would reduce air emissions overall by reducing harvest-related traffic and equipment use, and eliminating prescribed burning. Impacts would remain, however, due to continued recreational traffic on existing roads, lack of a road management plan, and an increased risk of severe wildfires in the absence of active fire suppression measures.
Alt. B						Alternative B would maintain emissions at historic levels associated with the 1983 land. These levels do not contribute significantly to violations in air quality standards. Alternative B would not be significantly different from alternative C1 in its overall level of air pollutant generating activity related to timber harvest, except for having a lower level of road improvement (i.e., no Road Management Plan) and thus not achieving the associated long-term reduction in PM10 generation.
Alt. C1 May 2002 DFMP						There is no substantial difference among Alternatives C1, C2, D, E, and F. All would result in reduced air quality impacts due to an active Road Management Plan when compared to Alternatives A or B. Less than significant impacts, however, would still occur due to continued road use, recreation, and timber harvest activities.
Alt. C2 Nov. 2002 Plan						
Alt. D						
Alt. E						
Alt. F						
Impact 2. Conflicts or obstructs implementation of the applicable air quality plan						
Alt. A						No alternative directly conflicts with or obstructs implementation of any air quality plan.
Alt. B						
Alt. C1 May 2002 DFMP						
Alt. C2 Nov. 2002 Plan						
Alt. D						
Alt. E						
Alt. F						

Table VII.5.6. Comparison of Air Quality Impacts by Alternatives.						
Alternatives						**Discussion**
Impact*	**1**	**2**	**3**	**4**	**5**	***Impact Levels: (1) Beneficial (2) No Impact (3) Less than Significant (4) Less than Significant after Mitigation (5) Significant–Mitigation Not Feasible**
Cumulative Impact 3. Results in a cumulatively considerable net increase in PM10 emissions.						
Alt. A			■			Alternative A would reduce PM10 emissions overall by reducing harvest-related dust and burning. Impacts would remain, however, due to continued recreational traffic on existing roads, lack of a Road Management Plan, and an increased risk of severe wildfires in the absence of active fire prevention measures.
Alt. B			■			Alternative B would maintain emissions at historic levels as monitored by the Air District. For Alternative B there is no specific Road Management Plan. Roads are constructed and maintained as needed to support operations. As discussed above, PM10 emissions also result from slash burning.
Alt. C1 May 2002 DFMP			■			Compared to Alternative B, there would potentially be an increase in slash burning for Alternatives C1 and C2. However, assuming that the degree of slash burning is proportional to the volume of timber harvested, this increase would be minimal, only about 7 percent. The resulting increase in PM10 emissions from slash burning would be more than offset by the decrease in PM10 emissions due to implementation of the Road Management Plan. The Road Management Plan in Alternatives C1, C2, D, E, and F would potentially reduce the number of traveled roads, increase maintenance of existing and new roads, surface existing and new roads intended for year-round log hauling and recreation, and implement a dust control program for roads.
Alt. C2 Nov. 2002 Plan			■			
Alt. D			■			
Alt. E			■			
Alt. F			■			
Impact 4. Result in the release or significant exposure of public to air toxics.						
Alt. A		■				Under this alternative, there would be minimal operation of diesel-powered equipment and associated amounts of diesel PM10.
Alt. B			■			There is no significant difference among alternatives B-F. All would have moderate levels of operation of diesel-powered equipment for road and timber management activities, releasing amounts of diesel PM10 below the MCAQMD threshold of concern.
Alt. C1 May 2002 DFMP			■			
Alt. C2 Nov. 2002 Plan			■			
Alt. D			■			
Alt. E			■			
Alt. F			■			